Citation:

Black JL, Macinko J. Neighborhoods and obesity. Nutr Rev. 2008 Jan;66(1):2-20.

PubMed ID: 18254880

Study Design:

Systemic Review

Class:

M - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

This review summarizes the literature on neighborhood determinants of obesity.

Inclusion Criteria:

- Outcome variables including a measure of body weight, physical activity or diet
- Independent variables including a neighborhood-level measure or assessment of a social, behavioral, or demographic predictor of obesity
- The study was conducted in a human population in an industrialized country.
- Only English-language articles were reviewed.

Exclusion Criteria:

all others not meeting inclusion criteria.

Description of Study Protocol:

Search procedure

The literature review was conducted from August 2005 through March 2007 by systemically searching the PubMed and PsychInfo databases.

Both databases were searched with the following keywords in their title or abstract: "neighborhood AND obesity."

The following combinations of keywords were searched in abstracts and titles: "obesity" AND "multilevel"; "SES"; "income"; "income inequality"; "race"; "supermarket"; "grocery store"; "fast food"; "farmers market"; "food policy"; "food price"; "restaurant"; "built environment"; "physical activity"; "crime"; and "transportation". The keyword "neighborhood" was also combined with "physical activity", "diet", "race", and "socioeconomic status".

Type of intervention and outcomes investigated

- measure of body weight
- physical activity
- or diet

Data Collection Summary:

Type of information abstracted from articles

Results were grouped according to the major neighborhood characteristics analyzed in the literature.

How was data combined:

- Macro-level social, historical, and economic factors that shape overall neighborhood context
- neighborhood or meso-level living conditions, such as infrastructure and services
- local availability and quality of food
- neighborhood characteristics that promote or inhibit physical activity

Description of Actual Data Sample:

# of articles included: 36 included a specific measure of body weight status or obesity

# of articles identified: 2000 potential articles were identified; 90 of which assessed at least one neighborhood determinant of obesity

Studies of neighborhood- and area-level socioeconomic resources and obesity

Reference	Country, location (population sampled)	Sample size	Study design	Neighborhood metric	Height and weight data	Body weight outcome(s)
Chang (2006)	USA (MSAs with >10% black)	46,881 (130 MSAs)	M	MSAs	Self-reported	Overweight=BMI≥25; obese=BMI≥30
Chen & Paterson (2006)	USA, St Louis, MO (adolescents)	315	I	Census block group	Measured	BMI
Inagami et al (2006)	USA, Los Angeles County, CA	2620 (65 NHs)	M	Census tract	Self-reported	BMI
Janssen et al (2006)	Canada (students in grades 6-10)	6684 (169 schools)	M	5 km Radius around school	Self-reported	Obese=BMI≥30
King et al (2006)	Australia, Melbourne	4913 (50 NHs)	M	Census collector district	Self-reported	BMI
Mobley et al (2006)	US States: CT, MA, NE, NC, SD (low-income women)	2692 (222 NHs)	M	Zip code	Measured	BMI
Monden et al (2006)	Netherlands, Eindhoven	8802 (86 NHs)	M	Administrative unit	Self-reported	Overweight=BMI≥25
Nelson et al (2006)	USA (students in grades 7-12)	20,745	I	Constructed via cluster analysis	Self-reported	Overweight=BMI≥95th percentile
Spillsbury et al (2006)	USA, Cleveland (African American children)	843	I	Census tract	Measured	BMI percentile for age
Boardman et al (2005)	USA	402,154	M	"Very small areas" from NHIS	Self-reported	Obese=BMI≥30
Vandergrift & Yoked (2004)	USA	47	E	State	Self-reported	Obesity=% per state with BMI≥30
Robert and Reither (2004)	USA	3617	M	Census tract	Self-reported	BMI
Van Lenthe et al (2002)	Netherlands, Eindhoven	8897 (86 NHs)	M	Census tract	Self-reported	Overweight=BMI≥25
Sundquist et al (1999)	Sweden	9240	I	Small area market	Self-reported	Overweight and obesity
Davey Smith et al (1998)	Scotland, Renfew and Paisley	6961 men (7991 women)	I	Postcode sector and enumeration district	Measured	BMI
Ellaway et al (1997)	Scotland, Glasgow	691 (4NHs)	I	Socially contrasting neighborhoods	Measured	Obese=BMI≥30

Abbreviations: E, ecologic; I, individual; M, multilevel; MSAs metropolitan statistical area; NHs neighborhoods; NHIS, 1990-1994 National Health Interview Survey

Studies of income equality and obesity

Reference	Country,location (population sampled)	Sample size	Study design	Main measure(s)	Association with BMI/weight status	Metric of income inequality measure	Height and weight data	Body weight outcome(s)

	USA: CT, MA, NE, NC, SD (low income women)	2692; 88 NHs	M	Income sispersion	Ø	County	Self-reported	BMI
Mobley et al (2006)								
Picket et al (2005)	Large, high income countries	21	E	Gini coeeficients, UNDPHP indicators	+	Country	Pooled data from the International Obesity Taskforce	Proportion obese (BMI≥30) per country
Robert & Reither (2004)	USA	3617	M	Gini coefficients	+	Census tract	Self-reported	BMI
Diez-Roux et al (2000)	USA	81,557 44 states	M	Robin Hood Index	+ for women only	State	Self-reported	BMI
Kahn et al (1998)	USA	34,158 male; 42,741 female 21 states	I	Household Inequality Index	+ for men only	State	Self-reported	Self-reported weight gain in waist

Abbreviations: E, ecologic; I, Individual; M, multilevel; MSAs, metropolitan statistical areas; NHs, neighborhoods

Studies of neighborhood and racial composition and obesity

Reference	Country, location (population sampled)	Sample size	Study type	Measure(s) of racial composition	Association with BMI/weight status	Neighborhood metric of SES measure	Height and weight data	Body weight outcome(s)
Chang (2006)	USA (MSAs with >10% black)	46,881; 130 MSAs	M	Index of racial isolation	+for blacks; Ø for whites	MSA	Self-reported	BMI; overweight=BMI≥25
Mobley et al (2006)	USA States: CT, MA, NE, NC, SD (low-income women)	2692; 88 NHs	M	Index or racial segregation	Ø	Zip code	Measured	BMI
Boardman et al (2005)	USA	402,154	M	Proportion black	+	"Very small areas" from NHIS	Self-reported	Obese=BMI≥30
Robert & Reither (2004)	USA	3617	M	Percent black	Ø	Census tract	Self-reported	BMI

Abbreviations: E, ecologic; I, Individual; M, multilevel; MSAs, metropolitan statistical areas; NHs, neighborhoods

Studies of neighborhood food availability and obesity

Reference	Country, location (population sampled)	Sample size	Study type	Main measure	Method of measuring food access	Association with BMI/weight status	Height and weight data	Body weight outcomes
Inagami et al (2006)	USA, Los Angeles County, CA	2620; 65 NHs	M	Access to primary grocery store	Distance between residence and census tract centroid	+ For father distances	Self-reported	BMI
Morland et al (2006)	USA, states: MS, NC, MD,MN	10,763; 207 NHs	M	Availability of food stores	Number of food stores per census tract	- For supermarkets; + for convenience stores	Measured	Overweight=BMI≥25; obese=BMI≥30

Jeffery et al (2006)	USA, state: MN	1033	I	Access to restaurants	Restaurant outlet density within 2 mile radius of work and home	Ø for fats food; -for men with more restaurants near work	Self-reported	BMI	
Mobley et al (2006)	USA, states: CT, MA, NE, NC, SD (low-income women)	2692; 222 NHs	M	Availability of food stores	Density of grocery stores, fast food, restaurants and mini-marts per zip code	Ø	Measured	BMI	
Sturm and Data (2005)	USA, (children >4 years old followed until 3rd grade)	6918; 724 schools; 59 MSAs; 37 states	M	Access to food stores	Distance from home and school zip codes to grocery stores, convenience stores and restaurants and food prices	Ø + for fruit and vegetable price index	Measured	BMI	
Maddock (2004)	USA	50 states	E	Availability of fast food	State-level availability (square miles and populationper outlet) of McDonalds and Burger King	+	State-level aggregates based on self-reported data	Percent obese (BMI≥30) per state	
Burdette and Whitaker (2003)	USA, Cincinnati, OH (3-4-year old children in WIC)	7020	I	Availability of fast food	Distance from home to fast-food outlet	Ø	Measured	Overweight=BMI≥95th percentile	

Ø, no significant association; +, positive association; -, negative association

Abbreviations: E, ecologic; I, Individual; M, multilevel; MSAs, metropolitan statistical areas; NHs, neighborhoods

Studies of neighborhood physical activity environment and obesity

Reference	Country, location (subpopulation studied)	Sample size	Study type	Type of measure	Main neighborhood variable(s)	Metric of neighborhood measure	Association with BMI/weight status	Height and weight data	Body weight outcome
Boehmer et al (2007)	USA, Savannah, GA and St. Louis, MO	1032	I	Perceived and objective	Recreation facilities, land use, transportation, aesthetics	Perceived objective 400 m buffers from residence	+For perceived lack of destinations, sidewalks and objective poor sidewalk quality, physical disorder, garbage; Øfor recreation facilities, traffic safety	Self-reported	Obese=BMI≥30
Berke et al (2007)	USA, King County, WA (older adults 65-97 years)	936	I	Objective	Walkability score	1-3 km buffers from residence	Ø for walkability	Measured	BMI

Poortinga (2006)	England	14,836; 720 postcodes	M	Perceived	Self-rated local environment features (e.g. access to amenities, physical features, reputation, aesthetics, social support and capital)	Perceived neighborhood	+for social nuisances; - for perceptions of the social environment	Measured	Obese=BMI≥30
Mobley et al (2006)	USA; CT, MA, NE, NC, SD (low-income women)	2692; 222 NHs	M	Objective	Land use, fitness facilities per 1000 residents, robbery arrest per 100,000	Zip code	- for mised land use, fitness facilities; + for crime	Measured	BMI
Gordon-Larsen et al (2006)	USA (adolescents)	20,745	I	Objective	Access to physical activity facilities	Block group	- for increased facilities	Self-reported	Overweight=BMI≥95th percentile
Nelson et al (2006)	USA (students grade 7-12)	20,745	I	Objective	Access to physical activity facilities, walkability, crime used to define neighborhood clusters	3-km distance from residence	+ for rural working class and exurban and mixed-race urban areas	Self-reported	Overweight=BMI≥95th percentile
Lumeng et al (2006)	USA children (7019 years)	768; 10 NHs	I	Perceived	Parental perceptions of neighborhood safety	Perceived neighborhood	- for perceived safety	Self-reported	Overweight=BMI≥95th percentile
Glass et al (2006)	USA, Baltimore, MD (age50-70 years)	1140; 65 NHs	M	Perceived	Neighborhood psychosocial hazard scale	Baltimore "city neighborhoods"	+ for perceived psychosocial hazards	Self-reported	Obese=BMI≥30
Timperio et al (2005)	Australia, Melbourne (families with children ages 5-6 and 10-12 years)	291 families of 5-6 and 919 families of 10-12 year olds	I	Perceived (by parents and children)	Neighborhood access to physical activity facilities, traffic and safety	Perceived neighborhood	+ for parental perception of traffic, concern for road safety with children aged 10-12 years	Measured (for children)	Obese=BMI≥30
Ellaway et al (2005)	Europe	6919; 8 countries	I	Perceived (by surveyors)	Graffiti, litter, dog mess, and greenery	Immediate residential environment	- for green space; + for graffiti, garbage	Self-reported	Overweight/obese =BMI≥25
Rutt and Coleman (2005)	USA, El Paso, TX (mainly Hispanic)	996	I	Perceived	Physical environment characteristics, barriers to exercise	2.5 mile radius	+ for land use mix	Self-reported	BMI
Lopez-Zetina (2005)	USA, CA	33 counties	E	Objective	Aggregate VNT per county	County (with >100,000 residents)	+ for county VMT	Self-reported	County-level % obese (BMI≥30)
Vanderfrift and Yoked (2004)	USA	50 states	E	Objective	Urban sprawl	State level	+ for amount of developed land	Self-reported from secondary data	State-level percent obese (BMI≥30)
Frank et al (2004)	USA, Atlanta, GA	10,878	I	Objective	Land use mix	1-kb distance from residence	- for mixed land use	Self-reported	Obese=BMI≥30

| Saelens et al (2003) | USA, San Francisco, CA | 107 | I | Perceived | Neighborhood environment walkability scale | Perceived neighborhood | - for walkability | Self-reported | Overweight=BMI≥25 |

Abbreviations: E, ecologic; I, Individual; M, multilevel; MSAs, metropolitan statistical areas; NHs, neighborhoods; VMT, vehicle miles traveled

Summary of Results:

Key Findings

- From 37 studies, the influence of neighborhood factors on obesity are mixed.
- Neighborhood-level measures of economic resources were associated with obesity in 15 studies
- The associations between neighborhood income inequality and racial composition with obesity were mixed.
- The availability of healthy versus unhealthy food was inconsistently related to obesity.
- Neighborhood features that discourage physical activity were consistently asociated with increased body mass index.

Other Findings

- This review suggests that, at minimum, individual-level approaches such as diet and exercise guidelines need to recognize potential barriers to good health imparted by the neighborhood context.

Author Conclusion:

Characterisitcs of the built environment and neighborhood opportunities for physical activity are consistently associated with reduced body weight status, while the influence of food avialability on obesity is mixed. The efficacy of targeted neighborhood interventions to reduce obesity remains unknown.

Reviewer Comments:

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search termsused described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issued considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes